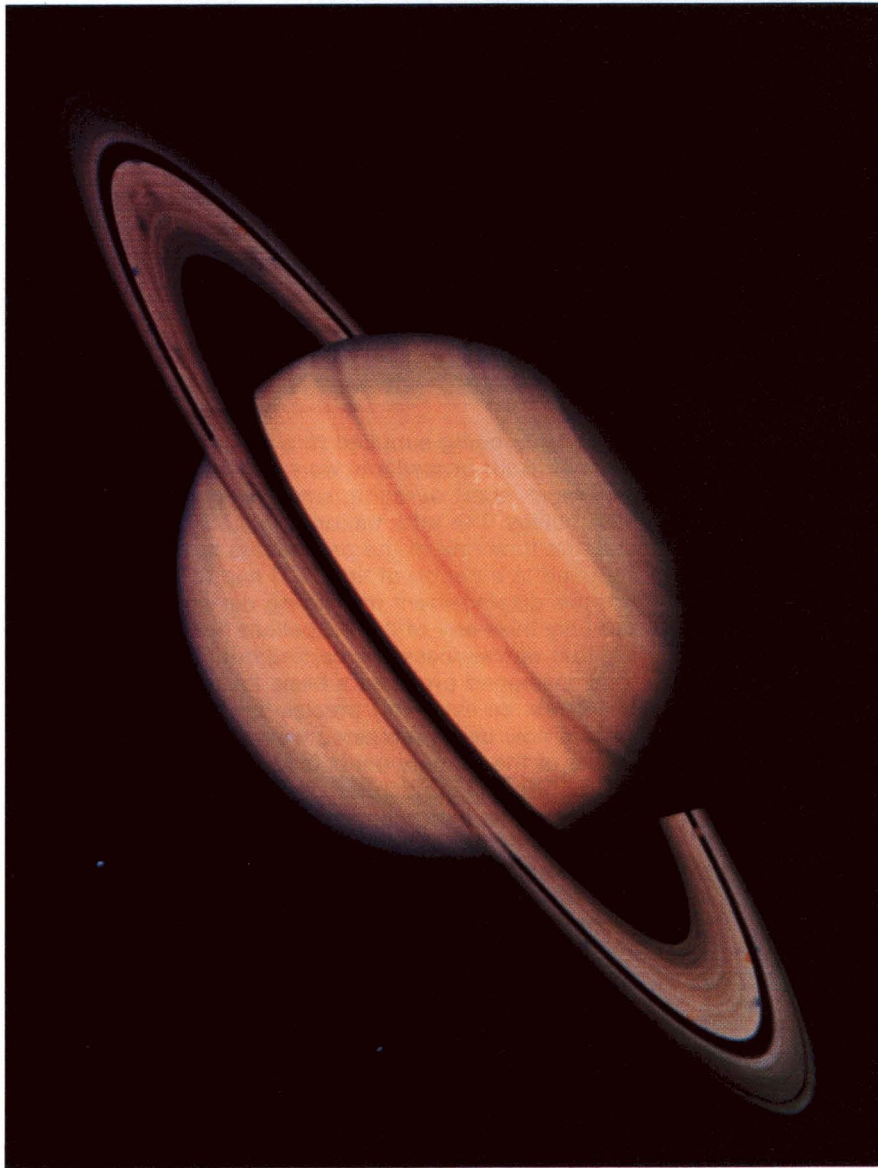


SPACE-SPURRED COMPUTER GRAPHICS

A line of sophisticated image generating equipment highlights examples of technology transfers in the field of computer processing



This picture of the planet Saturn was created by a DICOMED Corporation film recorder, which constructed the image by processing digital signals from a Voyager spacecraft.

Computer-generated graphics, the art of converting digital information into pictorial presentations, is one of the most rapidly growing businesses in the United States. This technology is finding increasing acceptance in resources management, industrial design, business slide shows, company publications, motion pictures, video games and a mushrooming variety of other activities. Yet little more than a decade ago this bustling industry was virtually non-existent. It came to life only after certain major graphics users, mostly scientific organizations, sparked development of technology improvements necessary to realization of the art's commercial potential. A principal influence in advancing computer graphics technology was NASA's introduction of imaging spacecraft, such as the Landsat family of Earth resources satellites and the far-roaming Voyagers that returned thousands of magnificent pictures of Jupiter and Saturn.

Imaging spacecraft do not take photographs in the conventional sense. Their instruments make electronic impressions of a scene and beam them back to Earth as digital signals. On Earth, the signals are translated into imagery by computer processing, displayed on a screen and photographed. The processing equipment is an integral and very important part of the data gathering function, hence must be as advanced as technology permits. NASA's ever-increasing need for greater processing capability and better image resolution, or clarity of detail, spurred technology gains and contributed substantially to the widening commercial acceptance of computer graphics. That point is exemplified by the experience of DICOMED Corporation, Minneapolis, Minnesota.

In the early 1970s, when

DICOMED was an infant producer of graphics equipment, available display screens had very limited resolution and just two intensity levels: on and off. DICOMED developed a display unit that offered excellent resolution and allowed 64 intensity levels—meaning that a gray area in the picture could actually be shown in various shades of gray, rather than as varying ratios of black and white dots. That represented a big jump in the art—but it wasn't good enough for what NASA had in mind. To record images sent from Mars by Viking spacecraft, NASA needed processing capabilities that were well beyond the state of the art at that time. DICOMED was asked to develop them.

Under contract with Jet Propulsion Laboratory (JPL), DICOMED produced a D47 Film Recorder that provided a major advance in resolution, an increase

type styles. When the design is completed, the image can be converted to high resolution 35 or 16 millimeter films, 8 by 10 inch transparencies, or video tape. It can also be recorded and stored as digital data by a film recorder such as DICOMED's D148S, a refined and considerably improved version of the first DICOMED system developed for NASA/JPL. The D148S Film Recorder, a computer and the essential software are all combined in the company's Dicomedia Color Slide System, which takes input from a design station and records it on film as color graphics, including slides, simulation, animation and direct color microfiche.

DICOMED still provides equipment to NASA and other scientific organizations, but its customer list has expanded considerably. In addition to a variety of business graphics applications,



DICOMED's D148S Film Recorder is an improved version of an image processing system developed for NASA.



to 256 intensity levels, and a capability for color recording across virtually the entire spectrum. That development gave DICOMED a strong technology base that the company has built upon to create an increasingly sophisticated line of computer graphics equipment for an ever-widening range of markets.

In addition to film recorders, DICOMED now manufactures computerized design stations that allow an artist to create images on a terminal screen and—by giving simple commands—to change colors, shapes, sizes and relationships of the figures involved or to add text in a variety of

DICOMED systems are being used by industrial engineers to record Computer-Aided Design and Computer-Aided Manufacturing information; film makers are using DICOMED equipment to produce computer-generated animation; and the Hennepin County (Minnesota) Surveyor's Office is using a DICOMED unit to update maps at substantial savings to the taxpayer. These and many other applications, DICOMED says, owe their origins to the demanding requirements of the aerospace and scientific communities, which dictated the technology developments that made commercial systems possible.

Using a DICOMED design station, an artist produced this graphic—the metamorphosis of a caterpillar into a butterfly—by manipulating computerized figures to create the caterpillar at far left and the butterfly at far right, then commanding the computer to interpolate the intermediate stages.